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for obvious reasons, comment upon these necessary ideas of the reason and their significance. I merely ask the reader to put to himself, in the light of the discussions contained in Part IV, the following questions : Is Wundt a realist? Does he believe in an external world independent of the percipient? Is he an empiricist? Does his philosophical system, as a system, rest upon the foundations furnished by empirical science? Or is it a modified Kantian doctrine, which contains *a priori* elements not clearly recognized to be such?

Philosophy is in a transition stage. The empiricist of to-day is not the crude and unreflective empiricist of an earlier time. The realist is not the uncompromising opponent of every suggestion made by the idealist that he once was. In this flux of theories, it cannot but be of value to consult the work of an eminent scholar, who appears to many to have a foot in either camp, and one whose erudition forbids the supposition that he is writing in ignorance of whatever facts and theories science is in a position to offer us.

GEORGE STUART FULLERTON.

COLUMBIA UNIVERSITY.

Voraussetzungen und Ziele des Erkennens. Untersuchungen über die Grundfragen der Logik. Von JONAS COHN. Leipzig, Wilhelm Engelmann, 1908. — pp. v, 526.

The work before us offers a noteworthy and very suggestive contribution to the discussion of epistemological and logical problems, if not also a positive advance in theory. The writer, a professor at Freiburg, is a former student of natural science who was drawn into philosophy by the antinomies suggested by the conception of the infinite, and he brings to his task a thorough grasp of recent speculation in mathematics and theory of science as well as of the history of philosophy and modern logic. With the recent English and American studies of logic and value, however, which might be expected to concern him closely, he seems to be wholly unacquainted. He writes very concisely, yet with an ease and fluency of style approaching elegance; and to the constantly attentive reader the present paragraph is always perfectly clear. Not so, however, the larger division of which it forms a part. The structure of the argument recalls somewhat the magazine serial, in which complication is added to complication, and the mystery steadily deepens, until just before the end. It is fair to say that he finally fulfils his promise of giving unity and meaning to his investigations, but in the meantime I think he has rendered a not very easy task needlessly difficult. And the difficulty is increased somewhat by the introduction of a private terminology, which is elaborated considerably beyond his present needs.

Several motives are interwoven in the texture of the argument. The simplest way of viewing the book as a whole is to regard it as a new Critique of Pure Reason. As with Kant, his problem is the relation of *Begriff* and *Anschauung*, of the forms of thought and the material of thought, of science and reality, and the interpretation of space, time, and the categories. And for him, as for Kant, the contrast of *Begriff* and *Anschauung* (though the distinction is relative) marks an irreducible dualism. Only his work is in no sense a commentary upon Kant, but a positive extension of Kant's analysis along lines of his own, with special reference to the conception of truth as an expression of value. And, unlike Kant, he makes no pretence to offer a system either of epistemology or of logic. His conception of both, and of logic in particular, is based upon the analogy of modern mathematical theory. Contrary to popular ideas upon the subject, mathematics is not a unified system. The prime numbers, for example, for which a serial formula has been vainly sought, are an uncoördinated residuum resulting from the combination of the distinct processes of addition and multiplication. And modern mathematical theory does nothing more than derive its body of statements distributively from the several axioms underlying them, classifying the axioms, indeed, as prior and posterior, but leaving them in the end distinct and underived from any general principle. So of logic. It is a mistake to assume that all logical relations may be derived from the law of contradiction, much less from the law of identity. The processes of inversion and mediate inference, for example, rest upon axioms of their own, axioms which presuppose, indeed, the axiom of contradiction but can only be fully accounted for by reference to the specific aims of knowledge. And so again of the epistemological categories. They presuppose certain fundamental principles, from which, however, they cannot be derived. The author's aim is therefore to present, not a system, but an analysis, which he will make as coherent as possible, of the several postulates, — which are both presuppositions and aims, — of knowing. And in particular he seeks to show the bearing upon the whole problem of certain principles which he regards as especially his own.

The exposition of these principles is given in Part I. They are: (1) the principle of immanence. Here the author gives his interpretation of the proposition, no object without a subject. When we undertake to know an object, what is the peculiarity of our aim? It is not, as commonly defined, to view the object as something independent of the knower, for an object thus independent could never be known. It is rather to view the object from the standpoint of the ideal knower; of the knower who has abstracted from all the peculiarities of character and position belonging to his individual self; in other words, from the standpoint of the superindividual ego (*überindividuelles Ich*). This standpoint is not that of the 'normal' or average man. Nor, the author seems to imply, is it a 'social' standpoint. Nor, again, is it ever actual. It is simply the ideal, necessary yet forever unattainable, of the conscious process so far as it seeks simply and purely to know. (2) Next the principle of utraquism (*i. e.*, 'bothism,' and in plain English, dualism. "Utraquism," I suppose, is framed to emphasize the point that the question is of one or both, never of more than two). Utraquism means that in every process of knowing there are two irreducible elements, an element of thought (*Denkform*) and an element foreign to thought (*Denkfremdes*), or a *datum*. Not only, as Kant claimed, are ideas without perceptions empty and perceptions without ideas blind, — there can be no empty ideas and no blind perceptions. The vaguest form of consciousness, *e. g.*, a feeling of pleasure, so far as known, admits of affirmation or denial, and thus involves an element of *Denkform*. On the other hand, the purest conceptions of the superindividual ego must be conceived to contain a foreign *datum*, for otherwise they could not be said to constitute knowledge. The extent to which one element or the other predominates varies, however, with different departments of thought, and the study of these variations is one feature of the author's task. (3) Finally, we come to his theory of the judgment-relation, *i. e.*, of the relation involved in the judgment. The traditional logic recognizes only one form of relation, which is expressed by the copula 'is' in the form A is B, and is commonly interpreted as a relation of subsumption, sometimes erroneously as one of equality or of partial identity. But even 'is' has many meanings, as illustrated by 'this dog is brown,' 'the dog is a mammal,' 'my friend is in Paris.' And as a matter of fact there may be as many relations of terms in the judgment as there are relations of objects conceivable in thought. The analysis of the various relations determined by the axioms of inversion and mediate inference forms one of the interesting episodes of the book, but it cannot be given here even in summary. It may be said that the bearing of this principle upon his subsequent investigations, though not altogether obscure, is not so well made out as that of the other two. But it furnishes a basis for a statement of his main problem: Does the judgment-relation determine the order (*Zusam-*

menhang) of objects, or conversely? How far does thought control things? Granting the control of thought where the objects are abstracted qualities, still what shall we say of objects concretely located (*demonstriert*) in space and time?

This brings us to Part II, which is perhaps the most significant portion of the book. Here the author proposes, through the medium of a very intelligible summary and criticism of certain recent developments in mathematical speculation, an epistemological theory of (1) number and (2) space, in which they are interpreted as conditions which must be fulfilled by an object which is to be known. (1) Number is that which is true of an object by virtue of its being merely asserted, or posited. The first demand of knowledge is, let there be something, — not a wholly blind something, which would not be distinguishable from nothing, but a something which may be held fast in thought and treated as self-identical and distinct from other somethings, *i. e.*, let there be a *thing*. As just fulfilling this condition, anything may be substituted for any other, and from this possibility of substitution we have the concept of number. Number is thus the fulfilment in the object of the law of identity, which, according to the author, applies primarily to objects and not to the relations of objects, to the terms of a judgment rather than to their relation. But identity of objects, though nothing more is asserted, implies diversity of content. Otherwise even the equation $1 = 1$ would be meaningless.[1] And so, even here, in the region of purest construction, thought-form implies a foreign *datum*. In other words, pure mathematics is not pure thought, but only thought with a minimum of foreign matter. This theory of number is contrasted as utraquistic, on one side with the (rationalistic) theory of Russell, for whom number is the representative of ultimate logical classes, and on the other side with the (sensualistic) theory of Helmholtz and Kronecker, for whom number is an association of objects with arbitrary signs.

(2) As postulated of reality, space is homogeneous and continuous. Russell and Cantor have endeavored to derive these characters from those of the well-ordered number-series, and so to derive space from number. Their method is to fill up the gaps between the natural numbers with infinite series of rational numbers, each of which series will then be limited by two natural numbers (*e. g.*, the numbers 1 and 2), and thus will constitute an infinite whole. But, according to the

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[1] Here and elsewhere, the author emphasizes the point that mere identity, or again purely symmetrical relation, of subject and predicate would leave the thought just where it is and never admit of any further inference.

author, such a series presupposes that all the rational numbers between 1 and 2 can be reduced to fractions of a common denominator; whereas, let your denominator be as great as you please, there will always be rational numbers not covered by it. The series, therefore, while infinite, will never constitute a whole, and it will consequently never finally fill the gap between 1 and 2. An infinite series can never be a whole. For a series can never determine its own limits. A limit implies something which can be transcended, hence something beyond the series limited. The series of rational numbers from 1 to 2 acquires its limits only by being thrust between the two natural numbers, which, however, have been derived from axioms other than those of the series and are thus not properly members of it. Not only, then, is continuity not to be derived from number, but the same is true of the so-called extensions of number, such as fractions and irrational numbers. Their construction presupposes other axioms beyond those of the natural numbers.

Why, then, is space homogeneous and continuous? Because, according to the author's theory, these characters are fundamental conditions of objective identification (*überindividuelle Demonstrierbarkeit*). The possibility of pointing out and identifying an object presupposes an order of objects which is independent of their content. In other words, the object must admit of theoretical construction and control. Objective identification, however, presupposes an order of objects independent of their relations to individual subjects. The fulfilment of these conditions is a continuous and homogeneous space. Here the structure of an object is not dependent upon the point from which it is viewed, the object is not fractured or distorted by being moved from one location to another (which would not be the case if space were a number-series), and its content is independent of its location. As regards the object space is absolutely passive and accommodating. By this argument the author derives space (and also time) from the fundamental postulates of knowledge, and at the same time bridges the difference which Kant left between the forms of intuition and the forms of thought. His argument is not unconvincing, and it suggests various lines of elaboration. Certainly it seems that the demand for clearness and objectivity has a tendency to drive us to spatial modes of distinction. We should ask nothing further if only he could produce an epistemological derivation for our three dimensions. Here, however, he is in difficulty. The postulates of measurement call, indeed, for free movement, and hence for a plurality of dimensions, but with regard to our trinity he can only claim, plausibly enough, that it must represent some postulate of knowing still to be analyzed.

Part III and the concluding Part IV may conveniently be considered together, as giving his general theory of the relation of science and reality. In Part IV, however, there is a treatment of the more general categories (for Kant the "forms of thought") as distinct from the categories of definite construction and identification dealt with in Part III. The categories specifically defined are those of comparability, substantiality, and causality. I must omit any further reference to them except to note, here again, that, while they all presuppose the general postulates of knowledge, no complete system or list of them is regarded by the author as possible. For example, they are not, as Schopenhauer claims, all to be derived from cause, nor, as the physicists tend to hold, is cause to be derived from the conservation of energy (substance). The conservation-law in itself furnishes no ground for change, and a world governed by it exclusively would consist at best of an unending repetition of the same cycle of events.

There are various conceptions of reality. Scientific reality, however,— the world of scientific construction, — may be contrasted with living reality (*Erlebende Wirklichkeit*), the world of concrete life and experience. The ideal of scientific reality is a closed, articulated system, but the living reality is inexhaustible, though it points to an ideal unity of its own. The relation of scientific to living reality varies, however, with the different sciences. The sciences may be arranged in the following series: mathematics, physics, biology, psychology, the value-sciences, history. Only the first can be satisfied with the principles of pure construction. Each of the others has to introduce "completing principles," of a more or less teleological nature, in order to organize its subject-matter. But, on the other hand, each, so far as it is remote from constructive unity, is nearer to the living reality. And so there is a fundamental antithesis between science and (living) reality. The very peculiarity of knowing,— that of objective construction, — means that thinking, or knowing, must forever face an element foreign to thought. And yet the ideal of knowing is not merely to organize, but to organize all reality. What it all means, then, is that science of itself points to an ideal beyond science, logic to a hyperlogical ideal.

What, then, is the final meaning of knowledge? The answer, so far as given, is to be found in the author's conception of logic as a study of value (*Wertwissenschaft*). This conception dominates the book as a whole. As a matter of value, truth-value takes its place with moral, æsthetic, and other values, and a given coördination of all these values would constitute a personal *Weltanschauung*, the analysis of which furnishes the task for philosophy in the widest sense. It seems, then, that in last analysis the author's utraquism is also a thorough-going idealism, though his statement of his general point of view leaves many questions unanswered. One point, however, is significant, namely, the bearing of his logical doctrine upon the problem of free will. Free will implies for us the possibility of change, yet the world of science is a determinate and closed system. The solution of the antinomy lies in the conception of the world of science as the expression of an ideal, never, indeed, finally attainable but always to be striven for. In other words, science is not a copy of what once for all exists. It is true that for common thought the completely determinate world is, paradoxically, both a presupposition and a goal of knowledge (*Voraussetzung und Ziel*). But the presupposition becomes simply an ideal when logic is treated critically as a study of value. And this removes the impossibility of change; for in a world to be constructed yet never finally completed there is always room for change.

The book offers a rich field for critical discussion into which I may hardly enter. It should be said that the author's conception of the relation of science and reality is not altogether new. It is prefigured in Royce's distinction of the world of description and the world of appreciation,[1] and I have also made it the basis of an extended analysis of the motives underlying hedonistic and idealistic theories of morality.[2] These details in no wise diminish the fruitfulness and suggestiveness of the conception at the hands of the author. But, considering the nature of his subject, I think he may be held accountable for the extent to which his work suffers from his total neglect, or ignorance, of the literature of value contributed by Royce, James, Dewey, Baldwin, and the English pragmatists. It is significant that the question of the relation of science to social or practical action, of truth-value to social and economic values, is never even raised. His analysis of truth-value ends in the "self-guarantee of truth."

And this suggests a final point. One of the most valuable features of his work is his critical handling of the traditional logic, — which he calls the subsumption logic. To my view the most conspicuous feature of the traditional logic, directly suggested by the relation of subsumption, is its rectilinear mode of derivation in one direction only, and its consequent reference of all truth to certain opaque absolutes, either axioms or facts. This feature is accepted by the author without criticism. Indeed, his whole work is a search for such ultimates, of which the "self-guarantee of truth" is an example. And it is worth noting that his criticism of mathematical theory never touches its logical method. Yet just here, I should think, the question ought to arise, especially when, as in modern mathematics, one compares different types of space-systems. The slightest consideration of the axiom of parallels as determining our own type would seem to suggest that any other of its characters would do as well, and that the 'axioms' have therefore no prior validity but are simply members of a democratic system.

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[1] *The World and the Individual*, Second Series, p. 26 ff.

[2] *An Introductory Study of Ethics*, Chapters XIV, XV, and XVII.

WARNER FITE.

INDIANA UNIVERSITY.

Lectures on the Elementary Psychology of Feeling and Attention. By EDWARD BRADFORD TITCHENER. New York, The Macmillan Co., 1908. — pp. ix, 404.

"The system of psychology rests upon a three-fold foundation: the doctrine of sensation and image, the elementary doctrine of feeling, and the doctrine of attention." A sensation in psychology, by way of orientation, is "any sense-process that cannot be further analyzed by introspection," and this must be distinguished from the sensation of psychophysics which is the supposed sense-correlate of an elementary excitatory process posited by a physiological theory. Thus white is psychologically an elementary sensation while, according to the Young-Helmholtz theory, it is psychophysically compounded of three elements. An attribute of sensation, in psychology, is any aspect or moment or dimension which is inseparable,— without which the sensation vanishes: and the attributes of a sensation can ordinarily, but not always, vary independently of one another,— one quality in several intensities, one intensity of several qualities. Attributes are intensive or qualitative. All intensive attribute is changing when a sensation "moves along the shortest path to or from the zero-point"; a qualitative "when it moves in a direction that neither carries it towards nor withdraws it from the zero-point" (Müller). The qualitative attributes are special in the several senses, while the intensive are (with a few exceptions) common; and are, namely, intensity proper, extensity, duration, and clearness. This last "is the attribute which distinguishes the 'focal' from the 'marginal' sensation; it is